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12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The goal of this grant, AFOSR-93-94 was to obtain equipment for studying psychophysical and computational aspects of chromatic motion perception. The equipment consisted of color measurement, data capture, data storage and color presentation devices. Our main result include the influence of luminant motion information on equiluminant motion direction, the impact of equilumance on both page and RSVP reading, the development of computational method to eliminate motion blur, and adaptive computational model of motion perception at equilumance.

14. SUBJECT TERMS			15. NUMBER OF PAGES
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(DEPSCOR 92) COMPUTATIONAL MODELLING OF EQUILUMINANT VISION

Final Report for AFOSR93-94 Equipment grant

The goal of this grant, AFOSR-93-94 was to obtain equipment for studying psychophysical and computational aspects of chromatic motion perception. Most of the first year of the grant was spent purchasing and installing the equipment. The equipment consisted of color measurement, data capture, data storage and color presentation devices.

The equipment has been used in two completed Ph.D. Dissertations, one published manuscript, and several conference papers. Results from the work is summarized below:

1) Combining luminant and equiluminant motion streams - the work resulted in two studies presented at ARVO and a manuscript published in Perception [1,2,3]. The main result from this work is that the perceived direction of motion of equiluminant moving dots is not effected by the motion of luminant dots until the difference in their direction of motion is sufficiently close (i.e. <30 degrees).

2) Page and RSVP reading speed under luminant and equiluminant conditions for normal and disabled readers -- This work has resulted in a presentation at ARVO and a Ph.D. dissertation [4,5]. The main result is that for normal readers, equiluminant text dramatically slows reading speeds for page reading while having significantly less impact on RSVP reading speed rates. A secondary result is that RSVP presentation to disabled readers improved their reading speed but not as dramatically as that experienced by normal readers.

3) Eliminating motion blur through modulo switching circuits -- This work resulted in a Ph.D. dissertation [6]. Any device which senses light by integrating energy at a point, such as a video camera or our own eyes, will exhibit motion blur. Our main result is to demonstrate through computer simulation the elimination of motion blur using several layers of locally controlled switching networks.

4) Computational model of chromatic motion perception -- This work was presented at the conference on Mathematical Psychology [7]. The main result is that the perceived slowing of motion at equiluminance can be modeled by an adaptive computational structure where there are differences in the adaptive learning rates between informational channels. This suggests that the perceptual phenomena surrounding equiluminant stimuli may be the result of learning differences between neuronal pathways.

The availability of this equipment in 1994 was crucial to our being awarded an LEQSF grant (LEQSF-RCS-95-98) which supported the graduate and undergraduate students who maintained the laboratory and performed much of the work.

References

[1] S. Heidenreich and G. L. Zimmerman (1993), Evidence for directionally selective mechanism that integrates luminant and equiluminant motion , Investigative

Ophthalmology and Visual Science Supplement , 34, 1032.

[2] S. Heidenreich and G. L. Zimmerman (1994), Speed and contrast of luminant motion affect directional information of equiluminant motion , Investigative Ophthalmology and Visual Science Supplement , 35, 1270.

[3] S. Heidenreich and G. L. Zimmerman (1995) Evidence that Luminant and Equiluminant Motion Information are Integrated by Directionally Selective Mechanisms, Perception, 879-890.

[4] Beth O'Brien (1996) Luminance and Chromatic Contrast Effects on Skilled and Disabled Reading Performed with and without Required Eye Movements, dissertation advisor G. L. Zimmerman, Tulane University.

[5] Beth O'Brien and G. L. Zimmerman (1996) Reading under luminant and equiluminant conditions, Investigative Ophthalmology and Visual Science Supplement , 37,

[6] James Norton (1996) , A Vision Based Approach to Motion Deblurring, dissertation advisor G. L. Zimmerman, Tulane University.

[7] G. L Zimmerman and M. Canaday (1996), Computational model of equiluminant motion perception, 29th Conference on Mathematical Psychology, Chapel Hill, NC.

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FBM091

TULANE UNIVERSITY - F.Y. 93-94 FIFTH CLOSE
FINANCIAL RECORDS SYSTEM
REPORT OF TRANSACTIONS FOR 06/30/94

REPORT PAGE 32129
PROGRAM ID FBM091
ACCOUNT PAGE 1

ACCT: S-33996
DEPT: 45400

DEPSCOR92 COMPUTATIONAL MODELLING OF EQUILUMINANT VISION

TO: GEORGE ZIMMERMAN
ENGINEERING

OBJ CODE	DESCRIPTION	DATE	EC	REF.	2ND REF.	J.E. OFFSET ACCOUNT	BUDGET ENTRIES	CURRENT REV/EXP	COMMITMENTS	BATCH REF.	BATCH DATE
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	UPS SHIPMENTS 000001	06/21	061	101864	0629009	2-21049-8063	CR	10.95		MLR001	940623
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	FIRST LIGHT	06/03	048	P114344	5065728			203.50	203.50-	APC456	940603
	FIRST LIGHT	04/07	050	P114344					314.92	ENC188	940407
	THORLABS INC	06/23	050	P350423					355.20	ENC243	940623
	THORLABS INC	06/23	051	P350423					355.20-	ENC244	940624
3310	** TOTAL LABORATORY SUPPLIES							314.92			
3440	SAFE HARBOR COMPUTER	04/14	048	P345302	5058946			679.10	664.00-	APC381	940414
	FIRST SOURCE INTERNA	05/09	048	P347307	5060322			2,946.00	2,920.00-	APC419	940509
	SAFE HARBOR COMPUTER	02/22	050	P345302					751.00	ENC157	940222
	FIRST SOURCE INTERNA	04/06	050	P347307					2,930.00	ENC187	940406
	SAFE HARBOR COMPUTER	02/22	051	P345302					87.00-	ENC183	940330
3440	** TOTAL DP SOFTWARE							3,625.10			
4895	B & H PHOTO AND ELEC	06/27	048	P347793	5073843			223.60	187.80-	APC484	940627
	B & H PHOTO AND ELEC	04/19	050	P347793					187.80	ENC196	940419
	MCCANN ELECTRONICS	06/24	050	P350500					271.90	ENC244	940624
4895	** TOTAL OTHER							223.60	271.90		
5520	DIGITAL MICRONICS IN	01/26	048	P328347	5040589			2,640.00	2,640.00-	APC272	940126
	B & H PHOTO AND ELEC	03/28	048	P345133	5054780			35,757.00	35,757.00-	APC359	940328
	TROXELL COMMUNICATIO	04/04	048	P345132	5051327			410.00	410.00-	APC369	940404
	COLUMBIA AUDIO VISUA	04/06	048	P345131	5053943			2,378.00	2,378.00-	APC371	940406
	TROXELL COMMUNICATIO	04/07	048	P345132	5053063			1,813.67	1,813.67-	APC373	940407
	TROXELL COMMUNICATIO	04/07	048	P345132	5053064			3,335.00	3,335.00-	APC373	940407
	COLUMBIA AUDIO VISUA	04/15	048	P345131	5055167			2,593.50	2,593.50-	APC383	940415
	PYRAMID AUDIO PRODUC	04/26	048	P345134	5060323			2,138.00	2,138.00-	APC400	940426
	MINOLTA CORPORATION	04/29	048	P346834	5057262			5,954.26	5,954.26-	APC408	940429
	TROXELL COMMUNICATIO	05/23	048	P345132	5061935			757.89	757.89-	APC432	940523
	PYRAMID AUDIO PRODUC	04/26	048	P345134	5060323			2,138.00-	2,138.00	APD437	940526
	SPECTRUM SYSTEMS	06/03	048	P345134	5069544			2,138.00	2,138.00-	APC456	940603
	DIGITAL MICRONICS IN	01/07	050	P328347	R023514				2,640.00	ENC123	940104
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	B & H PHOTO AND ELEC	02/16	050	P345133	B036866				35,757.00	ENC153	940216
	PYRAMID AUDIO PRODUC	02/16	050	P345134	B036866				2,261.00	ENC153	940216
	MINOLTA CORPORATION	03/24	050	P346834	P344489				6,500.00	ENC180	940325

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To: Dolly
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Date: 6/24/97
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From: Candace
Co.: G & C
Phone #: 5581
Fax #: 8907

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FBMO91

TULANE UNIVERSITY - F.Y. 93-94 FIFTH CLOSE
FINANCIAL RECORDS SYSTEM
REPORT OF TRANSACTIONS FOR 06/30/94

REPORT PAGE 32130
PROGRAM ID FBMO91
ACCOUNT PAGE 2

ACCT: 5-33996 5520 DEPSCOR92 COMPUTATIONAL MODELLING OF EQUILUMINANT VISION TO: GEORGE ZIMMERMAN
DEPT: 45400 ENGINEERING

OBJ CODE	DESCRIPTION	DATE	EC	REF.	2ND REF.	J.E. OFFSET ACCOUNT	BUDGET ENTRIES	CURRENT REV/EXP	COMMITMENTS	BATCH REF.	BATCH DATE
	MINOLTA CORPORATION	03/24	051	P346834	P344489				545.74-	ENC186	940405
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	COLUMBIA AUDIO VISUA	06/30	060	P345131	6000786	0-12200-2110CR		750.00	750.00-	RJEA03	940630
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5525	ORIGINAL BUDGET	10/12	020		1042304		74,900.00			RJE318	931030
5525	** TOTAL SCIENTIFIC EQUIPMENT						74,900.00				
9810	COST SHARE	10/12	020		1042304		5,300.00-			RJE318	931030
9810	** TOTAL COST SHARE-DIRECT						5,300.00-				
	*** ACCOUNT TOTAL ***						69,600.00	62,713.78	8,894.90		

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ACCT: 5-33996 DEPSCOR92 COMPUTATIONAL MODELLING OF EQUILUMINANT VISION TO: GEORGE ZIMMERMAN
DEPT: 45400 ENGINEERING

OBJ CODE	DESCRIPTION	DATE	EC	REF.	2ND REF.	C.E. OFFSET ACCOUNT			BUDGET ENTRIES	CURRENT REV/EXP	COMMITMENTS	BATCH REF.	BATCH DATE
3020	VARIOUS	02/14	069	I800286	0030369	-	-	CR		3.84		CJET80	950227
3020	** TOTAL PH CRGS-LD-TELECOMM									3.84			
3025	PURCHASING DEPT	09/28	069	I800269	0010164	-	-	CR		.60		CJET90	940930
3025	** TOTAL PH CRGS-LD-ACQT									.60			
4850	STAGE LIGHTS INC	10/07	048	P354531	6018283					232.00	232.00-	APC622	941007
	DAMARK INTERNATIONAL	12/06	048	P354517	6032845					319.99	319.99-	APC693	941206
	DAMARK INTERNATIONAL	09/13	050	P354517							319.99	ENC051	940913
	STAGE LIGHTS INC	09/13	050	P354531							232.00	ENC051	940913
4850	** TOTAL MINOR EQUIPMENT									551.99			
4895	TAPE DISTRIBUTORS OF	09/30	048	P350500	6018301					257.75	257.75-	APC613	940930
	TAPE DISTRIBUTORS OF	06/24	051	P350500							12.40-	ENC051	940913
	TAPE DISTRIBUTORS OF	06/24	051	P350500							1.75-	ENC063	940929
4895	** TOTAL OTHER									257.75	271.90-		
5515	APPLIED MAGIC INC	03/31	048	P354582	6057801					1,700.00	1,700.00-	APC935	950331
	APPLIED MAGIC INC	09/14	050	P354582							1,700.00	ENC052	940914
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5520	COLUMBIA AUDIO VISUA	08/31	048	P345131	6000786					750.00	234.00-	APC526	940831
	COLUMBIA AUDIO VISUA	08/31	048	P345131	6000941					516.00-	516.00	APC526	940831
	MINOLTA CORPORATION	08/31	048	P344489	5048010					8,506.82		APC568	940831
	MINOLTA CORPORATION	08/31	048	P344489	6005665					8,506.82-	8,506.82	APC568	940831
	PYRAMID AUDIO PRODUC	05/26	048	P345134	6068830					61.50-	61.50	APC934	950526
	PYRAMID AUDIO PRODUC	05/29	048	P345134	5070854					123.00	123.00-	APC936	950529
	COLUMBIA AUDIO VISUA	02/16	051	P345131	B036866						516.00-	ENC035	940708
	MINOLTA CORPORATION	02/01	051	P344489							8,500.00-	ENC023	940803
	SPECTRUM SYSTEMS	02/16	051	P345134	B036866						61.50-	ENC138	950125
	COLUMBIA AUDIO VISUA	07/08	052	P345131	6000786						750.00	ENCY01	940718
	COLUMBIA AUDIO VISUA	06/30	052	P345131	0603501						516.00-	ENCC01	950630
	REV VCH ACCR-0600103	07/18	060	6000786	0700203	0-12200-2110DR				750.00-		RJEA03	940718
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5520	** TOTAL EDUCATIONAL EQUIP									453.30-	116.18-		
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